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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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Craig M. Carpenter

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EXAMINER

ZERVIGON, RUDY

ART UNIT

PAPER NUMBER

1792

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DELIVERY MODE

12/22/2008

PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b>	<b>Applicant(s)</b>	
	09/810,387	CARPENTER ET AL.	
	<b>Examiner</b>	<b>Art Unit</b>	
	Rudy Zervigon	1792	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

#### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

#### Status

- 1) ☒ Responsive to communication(s) filed on 15 October 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

#### Disposition of Claims

- 4) ☒ Claim(s) 1-29,37,38,40-44 and 46 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-29,37,38,40-44 and 46 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

#### Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 15 March 2001 is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

#### Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All    b) ☐ Some \*    c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

#### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)            | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948)   | Paper No(s)/Mail Date. _____                                      |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>11/4/2008, 10/15/2008</u> .                                   | 6) <input type="checkbox"/> Other: _____                          |

## **DETAILED ACTION**

### ***Continued Examination Under 37 CFR 1.114***

1. A request for continued examination under 37 CFR 1.114 was filed in this application after a decision by the Board of Patent Appeals and Interferences, but before the filing of a Notice of Appeal to the Court of Appeals for the Federal Circuit or the commencement of a civil action. Since this application is eligible for continued examination under 37 CFR 1.114 and the fee set forth in 37 CFR 1.17(e) has been timely paid, the appeal has been withdrawn pursuant to 37 CFR 1.114 and prosecution in this application has been reopened pursuant to 37 CFR 1.114. Applicant's submission filed on October 15, 2008 has been entered.

### ***Drawings***

2. The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, the “showerhead” must be shown or the feature canceled from the claim. No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as “amended.” If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an

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application must be labeled in the top margin as either “Replacement Sheet” or “New Sheet” pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

***Specification***

3. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: See above drawing objection.

***Claim Rejections - 35 USC § 112***

4. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

5. Claim 44 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the written description requirement. The claim contains subject matter which was not described in the specification in such a way as to reasonably convey to one skilled in the relevant art that the inventors, at the time the application was filed, had possession of the claimed invention. Applicant’s claimed “showerhead” is not described in the specification as originally filed.

***Claim Rejections - 35 USC § 102***

6. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

7. Claims 1-8, and 37 are rejected under 35 U.S.C. 102(b) as being anticipated by Posa; John G. (US 4747367 A). Posa teaches a chemical (56; Figure 1; column 5, lines 33-57) vapor

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deposition apparatus (Figure 4; column 7, line 57 - column 8, line 14) comprising: a deposition chamber (16; Figure 2,4; column 7, line 57 - column 8, line 14) (16; Figure 2,4; column 7, line 57 - column 8, line 14) defined by a chamber lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14) and a chamber body (16; Figure 2,4; column 7, line 57 - column 8, line 14), the chamber lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14) and a shell of the chamber body (16; Figure 2,4; column 7, line 57 - column 8, line 14) having similar thicknesses<sup>1</sup>, the chamber body (16; Figure 2,4; column 7, line 57 - column 8, line 14) having an innermost surface inside the chamber (16; Figure 2,4; column 7, line 57 - column 8, line 14) and an outermost surface outside the chamber (16; Figure 2,4; column 7, line 57 - column 8, line 14); and a valve body (100/300, 102, 114, 110, 112, 118, 120; Figure 4; column 6, lines 13-40) having an entirety of a seat (inside valve volumes 110, 118; Figure 2) within the chamber lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14), the seat (inside valve volumes 110, 118; Figure 2) forming a part of the chamber lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14), as claimed by claim 1<sup>2</sup>.

Posa further teaches:

- i. The apparatus of claim 1 wherein the chemical (56; Figure 1; column 5, lines 33-57) vapor deposition apparatus (Figure 4; column 7, line 57 - column 8, line 14) comprises an atomic layer deposition apparatus, as claimed by claim 2. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention

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<sup>1</sup> Proportions of features in a drawing are not evidence of actual proportions when drawings are not to scale. Because the reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value. However, the description of the article pictured can be relied on, in combination with the drawings, for what they would reasonably teach one of ordinary skill in the art. (In re Wright, 193 USPQ 332 (CCPA 1977). MPEP 2125.

<sup>2</sup> Alternative language *not* taught by the prior art is deleted for clarity.

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generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

- ii. The apparatus of claim 1 wherein the seat (inside valve volumes 110, 118; Figure 2) is within the chamber lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14) thickness, as claimed by claim 3
- iii. The apparatus of claim 1 wherein the valve body (100/300, 102, 114, 110, 112, 118, 120; Figure 4; column 6, lines 13-40) includes a portion of the chamber lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14) as at least a part of the seat (inside valve volumes 110, 118; Figure 2), as claimed by claim 4
- iv. The apparatus of claim 1 wherein the valve body (100/300, 102, 114, 110, 112, 118, 120; Figure 4; column 6, lines 13-40) comprises at least a part of a valve housing between the innermost and outermost surfaces of the chamber lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14), as claimed by claim 5
- v. The apparatus of claim 5 wherein the valve body (100/300, 102, 114, 110, 112, 118, 120; Figure 4; column 6, lines 13-40) includes a portion of the chamber lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14) as at least a part of the valve housing, as claimed by claim 6

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- vi. The apparatus of claim 1 further comprising at least a part of a process chemical inlet (124; Figure 2) to the valve body (100/300, 102, 114, 110, 112, 118, 120; Figure 4; column 6, lines 13-40) between the innermost and outermost surfaces of the chamber lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14), as claimed by claim 7
- vii. The apparatus of claim 7 wherein the chamber lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14) or body forms at least a part of the chemical inlet (124; Figure 2), as claimed by claim 8
- viii. The apparatus of claim 1 wherein the chamber lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14) thickness is much less than a chamber lid (100; Figure 2; 300, Figure 4; column 7, line 57 - column 8, line 14) width, as claimed by claim 37

***Claim Rejections - 35 USC § 102/103***

- 8. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
- 9. Claims 9-23, 25-29, 41, 42, 45, and 46 are rejected under 35 U.S.C. 102(b) as anticipated by Fukui et al (USPat. 5,002,928) or, in the alternative, under 35 U.S.C. 103(a) as obvious over Fukui et al (USPat. 5,002,928). Fukui teaches a chemical vapor deposition apparatus (Figure 1) comprising: a deposition chamber (14; column 4, lines 53-59) having a lid (top tapered portion of 14) and a shell of a body (remainder of 14 not of the lid portion) with similar thicknesses; a process chemical opening (portion 14 accommodating 7) completely through the lid (top tapered portion of 14); and an isolation mechanism (6) proximate the chemical opening (portion 14 accommodating 7) and selectively isolating the deposition chamber (14; column 4, lines 53-59)

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from receiving material through the chemical opening (portion 14 accommodating 7), a part of the lid (top tapered portion of 14) having the similar thickness providing a functional component of the isolation mechanism (6) such that the isolation mechanism (6) would be incomplete, nonfunctional, or otherwise not able to isolate material delivery from reaching the chamber absent the lid (top tapered portion of 14), as claimed by claim 9. Applicant's claim requirement of "a chemical vapor deposition apparatus" is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

Fukui further teaches:

- i. The apparatus (Figure 1) of claim 9 wherein the chemical vapor deposition apparatus (Figure 1) comprises an atomic layer deposition apparatus (Figure 1), as claimed by claim 10. Applicant's entire claim requirement is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed



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invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

- ii. The apparatus (Figure 1) of claim 9 wherein the isolation mechanism (6) comprises a valve (what is shown is a needle valve), as claimed by claim 11
- iii. The apparatus (Figure 1) of claim 11 wherein the lid (top tapered portion of 14) comprises at least a part of a seat (inside surface of 7; Figure 1; column 4; lines 28-31, 36-39, 53-60) of the valve (what is shown is a needle valve), as claimed by claim 12
- iv. The apparatus (Figure 1) of claim 11 wherein the lid (top tapered portion of 14) comprises at least a part of a housing (column 4; lines 28-31, 36-39, 53-60) of the valve (what is shown is a needle valve), as claimed by claim 13
- v. The apparatus (Figure 1) of claim 11 wherein the lid (top tapered portion of 14) thickness is substantially uniform, as claimed by claim 14
- vi. A chemical vapor deposition apparatus (Figure 1) comprising: a deposition chamber (14; column 4, lines 53-59) defined in part by a cylindrical chamber (14; column 4, lines 53-59) body (14; column 4, lines 53-59) and a single-piece, removable lid (top tapered portion of 14) lacking any piece-to-piece interface and having a circumference corresponding to a shape and a size of the chamber body (14; column 4, lines 53-59) where it joins with the lid (top tapered portion of 14), the chamber body (14; column 4, lines 53-59) size being selected to accommodate a semiconductor wafer (17) during CVD when such wafer (17) is parallel to the lid (top tapered portion of 14), the lid (top tapered portion of 14) having a thickness which is much less than a width of the lid (top tapered

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portion of 14) and which is similar to a shell thickness of the chamber body (14; column 4, lines 53-59), the chamber body (14; column 4, lines 53-59) shell thickness and lid (top tapered portion of 14) thickness being selected to accommodate pressures associated with atomic layer deposition; and a valve body (7,6; Figure 1) including a portion (7) of the single-piece lid (top tapered portion of 14) as part of the valve body (7,6, top portion of 14; Figure 1), the valve body (7,6, top portion of 14; Figure 1) selectively shutting off flow of a process chemical into the chamber (14; column 4, lines 53-59), adjusting the flow rate of the chemical into the chamber (14; column 4, lines 53-59), or both, as claimed by claim 15. Applicant's claim requirements of "chemical vapor deposition apparatus", "to accommodate pressures associated with atomic layer deposition" are claim requirements of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

- vii. The apparatus (Figure 1) of claim 15 wherein the chemical vapor deposition apparatus (Figure 1) comprises an atomic layer deposition apparatus (Figure 1), as claimed by claim 16. Applicant's entire claim is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an

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intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).

- viii. The apparatus (Figure 1) of claim 15 wherein at a 50% open position as indicated by a stem position the valve body (7,6, top portion of 14; Figure 1) provides a flow rate of no more than about 50% of a maximum flow rate through the valve body (7,6, top portion of 14; Figure 1), as claimed by claim 17. Applicant's entire claim requirement is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).
- ix. The apparatus (Figure 1) of claim 15 wherein the portion of the lid (top tapered portion of 14) comprises at least a part of a valve (6,7 is a needle valve) housing, as claimed by claim 18

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- x. The apparatus (Figure 1) of claim 18 wherein the part of the valve (6,7 is a needle valve) housing (inside 7) comprised by the portion of the lid (top tapered portion of 14) is defined by a cylindrical opening (7/14 interface) in the lid (top tapered portion of 14), the valve body (3,7,6, top portion of 14; Figure 1) further comprising a stem (3; Figure 1) coincident with a central axis of the cylindrical opening (7/14 interface) and positioned at least partially within the cylindrical opening (7/14 interface), as claimed by claim 19
- xi. The apparatus (Figure 1) of claim 15 wherein the portion of the lid (top tapered portion of 14) comprises at least a part of a valve seat (6/7 slanted interface), as claimed by claim 20
- xii. The apparatus (Figure 1) of claim 20 wherein the entirety of the valve seat (6/7 slanted interface) is between an innermost surface of the lid (top tapered portion of 14) inside the chamber (14; column 4, lines 53-59) and an outermost surface of the lid (top tapered portion of 14) outside the chamber (14; column 4, lines 53-59), as claimed by claim 21
- xiii. The apparatus (Figure 1) of claim 20 wherein the valve seat (6/7 slanted interface) comprises a plug (6) seat (6/7 slanted interface) or a diaphragm seat, as claimed by claim 22
- xiv. The apparatus (Figure 1) of claim 20 wherein the part of the valve seat (6/7 slanted interface) comprised by the portion of the lid (top tapered portion of 14) is defined by a beveled lid surface (top tapered portion of 14) around a cylindrical opening (7/14 interface) through the lid (top tapered portion of 14), the valve body (3,7,6, top portion of 14; Figure 1) further comprising a plug (6) complementary to the beveled lid surface (top tapered portion of 14), as claimed by claim 23

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- xv. The apparatus (Figure 1) of claim 15 wherein the portion of the lid (top tapered portion of 14) comprises at least a part of a process chemical inlet (10) in the valve body (3,7,6, top portion of 14; Figure 1), as claimed by claim 25
- xvi. The apparatus (Figure 1) of claim 25 wherein the apparatus (Figure 1) further comprises a process chemical inlet (11) through the lid (top tapered portion of 14) to the chemical inlet (10) in the valve body (3,7,6, top portion of 14; Figure 1), as claimed by claim 26
- xvii. A chemical vapor deposition apparatus (Figure 1) comprising: a deposition chamber (14; column 4, lines 53-59) having a lid (top tapered portion of 14) and a body with similar thicknesses, the lid (top tapered portion of 14) having an inner surface inside the chamber (14; column 4, lines 53-59), an outer surface outside the chamber (14; column 4, lines 53-59), and an opening (7/14 interface) completely through the similar thickness of the lid (top tapered portion of 14) thickness and defined by sidewalls forming a part of the similar thickness of the lid (top tapered portion of 14) and extending between the inner and outer surfaces; a valve body (3,7,6, top portion of 14; Figure 1) having a housing (inside 7) and a seat (6/7 interface); at least a part of the housing (inside 7) comprising at least a part of the outer surface of the lid (top tapered portion of 14) on the similar thickness, at least a part of the opening (7/14 interface) sidewalls of the lid (top tapered portion of 14) through the similar thickness, or both; and at least a part of the seat (6/7 interface) comprising at least a part of the inner surface of the lid (top tapered portion of 14) on the similar thickness, at least a part of the opening (7/14 interface) sidewalls of the lid (top tapered portion of 14) through the similar thickness, or both, as claimed by claim

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- xviii. The apparatus (Figure 1) of claim 27 wherein the chemical vapor deposition apparatus (Figure 1) comprises an atomic layer deposition apparatus (Figure 1), as claimed by claim 28. Applicant's entire claim requirement is a claim requirement of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP2111.02).
- xix. The apparatus (Figure 1) of claim 27 further comprising a process chemical inlet (10) to the valve body (3,7,6, top portion of 14; Figure 1), a lid (top tapered portion of 14) portion between the inner surface and the outer surface forming at least a part of the chemical inlet (10), as claimed by claim 29
- xx. A chemical vapor deposition apparatus (Figure 1) comprising a deposition chamber (14) defined in part by a cylindrical body (14; "solution-escaping inhibitor"; column 5; lines 1-2) and a circular lid (top tapered portion of 14) matched to a diameter of the cylindrical body (14; "solution-escaping inhibitor"; column 5; lines 1-2); an opening (conduit holding 6) formed through a thickness of the lid (top tapered portion of 14), the opening (conduit holding 6) defining at least a part of a valve seat (inside surface of 7; Figure 1);

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and a valve assembly (2-6; Figure 1) positioned to match a valve plug (6; Figure 1) or diaphragm with the valve seat (inside surface of 7; Figure 1), as claimed by claim 45

- xxi. A chemical vapor deposition apparatus (Figure 1) comprising: a deposition chamber (14; column 4, lines 53-59) defined in part by a cylindrical body (remainder of 14 not of the lid portion) and a single-piece, removable lid (top tapered portion of 14) lacking any piece-to-piece interface and having a circumference corresponding to a shape and a size of the body (remainder of 14 not of the lid portion) where it joins with the lid (top tapered portion of 14), the body (remainder of 14 not of the lid portion) size being selected to accommodate a semiconductor wafer (17) during CVD when such wafer (17) is parallel to the lid (top tapered portion of 14), the lid (top tapered portion of 14) having an inner surface inside the chamber (14; column 4, lines 53-59) and an outer surface outside the chamber (14; column 4, lines 53-59) and having a thickness which is much less than a width of the lid (top tapered portion of 14) and which is similar to a shell thickness of the body (remainder of 14 not of the lid portion), the body (remainder of 14 not of the lid portion) shell thickness and lid (top tapered portion of 14) thickness being selected to accommodate pressures associated with atomic layer deposition; an opening (at 3a) completely through the similar lid (top tapered portion of 14) thickness and defined by sidewalls forming a part of the lid (top tapered portion of 14) and extending between the inner and outer surfaces, the sidewalls having a shape that of itself defines a valve seat (6/7 seat), the entirety of the valve seat (6/7 seat) being positioned between the inner and outer surfaces; and a valve assembly (3,5,7) positioned to match a valve plug (6) or diaphragm with the valve seat (6/7 seat) making the lid (top tapered portion of 14)

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integral to the valve assembly (3,5,7) such that the valve assembly (3,5,7) would be incomplete, nonfunctional, or otherwise not able to isolate chemical delivery from reaching the chamber (14; column 4, lines 53-59) absent the lid (top tapered portion of 14), as claimed by claim 46. Applicant's claim requirements of "chemical vapor deposition apparatus", "to accommodate pressures associated with atomic layer deposition" are claim requirements of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto , 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

Fukui is not clear in either Fukui's specification or Fukui's not-to-scale drawings as to the relative thickness of Fukui's lid and Fukui's chamber body (see Figure 1)<sup>3</sup>. Fuka is further not clear as to whether Fukui's deposition chamber (14) is defined in part by a "cylindrical body" (14; "solution-escaping inhibitor"; column 5; lines 1-2).

Fukui is also not clear if his lid (top tapered portion of 14) is removable.

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<sup>3</sup>Proportions of features in a drawing are not evidence of actual proportions when drawings are not to scale. Because the reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value. However, the description of the article pictured can be relied on, in combination with the drawings, for what they would reasonably teach one of ordinary skill in the art. (In re Wright, 193 USPQ 332 (CCPA 1977). MPEP 2125.



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In the event that Fukui is not deemed to anticipate Applicant's claimed invention of "similar thickness" between Fukui's lid and Fukui's chamber body, or that Fukui is not deemed to anticipate Applicant's claimed invention of "cylindrical body":

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Fukui to optimize the relative dimension of Fukui's lid and Fukui's chamber body.

Motivation for Fukui to optimize the relative dimension of Fukui's lid and Fukui's chamber body is for scaling Fukui's deposition apparatus to accommodate plural nozzle structures as taught Fukui (column 3, lines 29-33). Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

10. Claims 38-40 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukui et al (USPat. 5,002,928). Fukui is discussed above. Fukui does not teach that the relative dimensions between Fukui's seat, chamber lid thickness, and chamber lid width as shown by Fukui's Figure 1.

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Fukui to optimize the relative dimensions of Fukui's seat, chamber lid thickness, and chamber lid width.

Motivation for Fukui to optimize the relative dimensions of Fukui's seat, chamber lid thickness, and chamber lid width is to provide for added structural integrity and/or to accommodate a requisite dimension of the substrate (17, Figure 1), further, for scaling Fukui's deposition

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apparatus to accommodate plural nozzle structures as taught Fukui (column 3, lines 29-33). Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art.(Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04). Further, proportions of features in a drawing are not evidence of actual proportions when drawings are not to scale. Because the reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value. However, the description of the article pictured can be relied on, in combination with the drawings, for what they would reasonably teach one of ordinary skill in the art. (In re Wright,193 USPQ 332 (CCPA 1977). MPEP 2125.

11. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fukui et al (USPat. 5,002,928) in view of Waterfield (USPat. 4,319,737). Fukui is discussed above. However, Fukui does not teach a diaphragm valve. Waterfield teaches a diaphragm valve (Figure 1).

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Fukui to replace his needle valve with Waterfield's diaphragm valve.

Motivation for Fukui to replace his needle valve with Waterfield's diaphragm valve is to provide an alternate and equivalent valve for delivering process fluids.

12. Claims 41-43 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fukui et al (USPat. 5,002,928) in view of Jeong, Kyung Cheol (USPat. 5,853,484). Fukui is discussed above. Fuki further teaches a chemical vapor deposition apparatus (Figure 1) comprising: a

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deposition chamber (14) defined in part by a chamber body (14; “solution-escaping inhibitor”; column 5; lines 1-2) and a single-piece, removable lid (top tapered portion of 14) lacking any piece-to-piece interface and having a circumference corresponding to a shape and a size of the chamber body (14; “solution-escaping inhibitor”; column 5; lines 1-2) where it joins with the lid (top tapered portion of 14), the chamber body (14; “solution-escaping inhibitor”; column 5; lines 1-2) size being selected to accommodate a semiconductor wafer (17) during CVD when such wafer (17) is parallel to the lid (top tapered portion of 14), the lid (top tapered portion of 14) having a thickness which is much less than a width of the lid (top tapered portion of 14) and which is similar to a shell thickness of the chamber body (14; “solution-escaping inhibitor”; column 5; lines 1-2), the chamber body shell (14; “solution-escaping inhibitor”; column 5; lines 1-2) thickness and lid (top tapered portion of 14) thickness being selected to accommodate pressures associated with atomic layer deposition; a valve body (3,7,6, top portion of 14; Figure 1) including a portion of the single-piece lid (top tapered portion of 14) as part of the valve body (3,7,6, top portion of 14; Figure 1), and a valve stem (3) that moves inward to the chamber (14) to allow or to increase flow of process chemical into the chamber (14) and moves outward from the chamber to shut off or to decrease process chemical flow into the chamber – claim 41. Applicant’s claim requirements of “a chemical vapor deposition” and “thickness being selected to accommodate pressures associated with atomic layer deposition” are claim requirements of intended use in the pending apparatus claims. Further, it has been held that claim language that simply specifies an intended use or field of use for the invention generally will not limit the scope of a claim (Walter , 618 F.2d at 769, 205 USPQ at 409; MPEP 2106). Additionally, in apparatus claims, intended use must result in a structural difference between the claimed

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invention and the prior art in order to patentably distinguish the claimed invention from the prior art. If the prior art structure is capable of performing the intended use, then it meets the claim (In re Casey, 152 USPQ 235 (CCPA 1967); In re Otto, 136 USPQ 458, 459 (CCPA 1963); MPEP 2111.02).

Fukui further teaches the apparatus (Figure 1) of claim 41 wherein the portion of the lid (top tapered portion of 14) comprises at least a part of a valve seat (6/7 interface), as claimed by claim 42.

Fukui further teaches the apparatus (Figure 1) of claim 42 wherein the part of the valve seat (6/7 interface) comprised by the portion of the lid (top tapered portion of 14) is defined by beveled lid (top tapered portion of 14) surface around a cylindrical opening through the lid (top tapered portion of 14), the valve body (3,7,6, top portion of 14; Figure 1) further comprising a plug (6) complementary to the beveled lid surface (6/7 interface), as claimed by claim 43

Fukui does not teach the valve body (3,7,6, top portion of 14; Figure 1) being adapted to receive external control signals selectively shutting off flow of a process chemical into the chamber, adjusting the flow rate of the chemical into the chamber (14; “solution-escaping inhibitor”; column 5; lines 1-2) – claim 41

Fukui is not clear in either Fukui’s specification or Fukui’s not-to-scale drawings as to the relative thickness of Fukui’s lid and Fukui’s chamber body (see Figure 1)<sup>4</sup>. Fukui is further not clear as to whether Fukui’s deposition chamber (14) is defined in part by a “cylindrical body” (14; “solution-escaping inhibitor”; column 5; lines 1-2).

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<sup>4</sup>Proportions of features in a drawing are not evidence of actual proportions when drawings are not to scale. Because the reference does not disclose that the drawings are to scale and is silent as to dimensions, arguments based on measurement of the drawing features are of little value. However, the description of the article pictured can be relied on, in combination with the

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Jeong teaches valve bodies (32-1; Figure 2) adapted to receive external control signals (22; Figure 2; column 3, lines 1-19) for delivering process gasses to Jeong's CVD chamber (10; Figure 2; column 2; lines 15-22). Jeong further teaches a gas distribution showerhead manifold (19; Figure 2) positioned to receive CVD deposition gases (abstract) from an opening (16; Figure 2).

In the event that Fukui is not deemed to anticipate Applicant's claimed invention of "similar thickness" between Fukui's lid and Fukui's chamber body, or that Fukui is not deemed to anticipate Applicant's claimed invention of "cylindrical body":

It would have been obvious to one of ordinary skill in the art at the time the invention was made for Fukui to optimize the relative dimension of Fukui's lid and Fukui's chamber body, and to add Jeong's control signal means to Fukui's valve body (3,7,6, top portion of 14; Figure 1).

Motivation for Fukui to optimize the relative dimension of Fukui's lid and Fukui's chamber body is for scaling Fukui's deposition apparatus to accommodate plural nozzle structures as taught Fukui (column 3, lines 29-33). Further, it is well established that changes in apparatus dimensions are within the level of ordinary skill in the art. (Gardner v. TEC Systems, Inc. , 725 F.2d 1338, 220 USPQ 777 (Fed. Cir. 1984), cert. denied , 469 U.S. 830, 225 USPQ 232 (1984); In re Rose , 220 F.2d 459, 105 USPQ 237 (CCPA 1955); In re Rinehart, 531 F.2d 1048, 189 USPQ 143 (CCPA 1976); See MPEP 2144.04)

Motivation to add Jeong's control signal means to Fukui's valve body (3,7,6, top portion of 14; Figure 1) is for achieving CVD film thickness uniformity as taught by Jeong (column 3; lines 11-15) in CVD operations.

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13. Claim 44 is rejected under 35 U.S.C. 103(a) as being unpatentable over Conger; Darrell R. et al. (US 4761269 A) in view of Mezey, Sr.; James J. (US 6331212 B1). Conger teaches A chemical vapor deposition apparatus (Figure 2; column 5; lines 54-65) including a deposition chamber (12; Figure 2) defined in part by a cylindrical body (12) and a circular lid (16) matched to a diameter of the cylindrical body (12); an opening (72) being formed completely through a thickness of the lid (16), having a central axis (along 72) entirely within the opening (72), and defining at least a part of a valve seat (77/72 interface); and a valve assembly (77+78+22a,b) positioned at least partially with the opening (72) to match a valve plug (77) or diaphragm with the valve seat (77/72 interface) – claim 44.

Conger does not teach a distribution showerhead positioned to receive deposition gas from an opening to provide deposition gas to the distribution showerhead.

Mezey teaches a similar cross-flow reactor (Figure 4) including a distribution showerhead (146; Figure 4, 5) positioned to receive deposition gas from an opening (74) to provide deposition gas to the distribution showerhead (146).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to add Mezey's distribution showerhead (146) to the apparatus of Conger.

Motivation to add Mezey's distribution showerhead (146) to the apparatus of Conger is for preheating the process gas to the process temperature and to impart laminar flow as taught by Mezey (column 11; lines 20-32).

### ***Response to Arguments***

14. Applicant's arguments filed October 15, 2008 have been fully considered but they are not persuasive.

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15. Applicant states:

“

Pages 5-9 of the February 14, 2008 Decision on Appeal (Decision) affirm rejection of claim 44 for failing to comply with the enablement requirement essentially because the recited distribution showerhead is a novel aspect of claim 44 and, thus, constitutes new matter. Applicant herein amends claim 44 to set forth a apparatus including a distribution showerhead positioned to receive deposition gas from an opening, wherein the improvement comprises a deposition chamber and a valve assembly. Consequently, by rewriting claim 44 in a format allowed by 37 CFR 1.75(e), the distribution showerhead is expressly set forth as matter which is conventional or known. The improvement comprises, among other features, the opening being formed completely through a thickness of the lid, having a central axis entirely within the opening, and defining at least a part of a valve...

“

In response, the Examiner believes that Applicant's amended claim 44 still is defective under 112, 1<sup>st</sup> paragraph under the more appropriate written description requirement. As pointed out by Applicant above, the BPAI decision affirmed the Examiner's 1<sup>st</sup> paragraph rejection *based on the showerhead* subject matter of the claim. Applicant's amended claim 44 is apparently now recited in Jepson format (2129 – 1.75(e)). However, even in this format, Applicant's specification is devoid of any antecedence for the claimed showerhead. The Examiner maintains his 112 1<sup>st</sup> paragraph rejection. Jepson practice *is not* a replacement for requirements under 112 1<sup>st</sup> paragraph.

Applicant states:

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“

Regarding the lid and chamber body similar thicknesses, it is unclear from the Decision on what basis Figures 4 and 5 of Posa may be considered to show the similar thicknesses. Specifically, it is readily apparent that the wall thickness of vent chamber 18 is much less than the thickness of manifold 300. Perhaps the Decision equates the outer diameter of vent chamber 18 to the claimed "thickness of the chamber body." Accordingly, Applicant amends claims 41 and 46 to set forth that the lid has a thickness which is similar to a shell thickness of the chamber body. Essentially, "shell thickness" is synonymous with "wall thickness," but the term "shell" is used to avoid confusion with the definition for "chamber wall" on page 6, lines 17-19 of the present specification. As a result, it should be clear that Posa fails to disclose the similar thicknesses set forth in claims 41 and 46.

“

And..

“

Applicant asserts that no person of ordinary skill would consider the Posa structures to have a similar thickness given the different function of the structures. That is, the thickness of manifold 300 accommodates process paths 302, vent paths 308, valve cavity 110, second valve cavity 118, and enough additional thickness to provide structural support. The walls of vent chamber 18 merely provide structural support for operating at process pressures.

“

In response, Posa does not disclose that his drawings are to scale. Further, proportions or features in a drawing are not evidence of actual proportions when drawings are not to scale. Because the



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reference does not disclose that the drawings are to scale and is silent as to dimensions, *arguments based on measurement of the drawing features are of little value*. However, the description of the article pictured can be relied on, in combination with the drawings, for what they would reasonably teach one of ordinary skill in the art. (In re Wright, 193 USPQ 332 (CCPA 1977). MPEP 2125.

Applicant further states:

“

However, the express text of Posa describing the function of manifold 300 supports the conclusion that manifold 300 has a different thickness in comparison to the walls of vent chamber 18.

“

In response, Applicant has not provided any citation in Posa to support the above position.

Applicant states:

“

Despite the different functions of the two structures, the Office has not presented evidence of why a person of ordinary skill would consider the thickness of the two structures to be similar. Applicant asserts no evidence exists that a person of ordinary skill would make the walls of vent chamber 18 with a thickness similar to manifold 300 since the additional thickness in the walls of vent chamber 18 would constitute a significant waste of unnecessary material. Applicant also asserts no evidence exists that a person of ordinary skill would make manifold 300 with a thickness similar to the walls of vent chamber 18. Process paths 302, vent paths 308, valve cavity 110, second valve cavity 118, and enough additional thickness could not be reasonably

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accommodated in the thickness of the walls of vent chamber 18. Even if technically possible to form such structures in a thickness of the walls ...

“

In response, the Examiner’s “evidence” is a plain meaning definition of Applicant’s claimed “similar”. The words of a claim must be given their “plain meaning” unless such meaning is inconsistent with the specification. MPEP 2111.01.

Applicant further states:

“

If considering fence 14 of Fukui to describe the claimed lid and valve holder 7 to describe the claimed isolation mechanism, it is readily apparent that fence 14 does not provide a functional component of valve holder 7. Valve holder 7 cannot itself be considered to provide the functional component of the isolation mechanism since it does not constitute a part of a lid having a similar thickness to a shell of a chamber body. At least for such reason, claim 9 is patentable.

“

In response, Applicant again refers to the claimed feature of “similar” thickness. In response, the Examiner refers to the above responses in the context of the same argument.

The remainder of the response, at pages 15-18, discusses the amendments to the claims. In response, the Examiner’s new grounds of rejection address each of the claim limitations amended and otherwise.

### ***Conclusion***

16. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Examiner Rudy Zervigon whose telephone number is (571) 272-

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1442. The examiner can normally be reached on a Monday through Friday schedule from 9am through 5pm. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300. Any Inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Chemical and Materials Engineering art unit receptionist at (571) 272-1700. If the examiner can not be reached please contact the examiner's supervisor, Parviz Hassanzadeh, at (571) 272- 1435

/Rudy Zervigon/

Primary Examiner, Art Unit 1792